

PROCEEDINGS  
OF THE  
BIOLOGICAL SOCIETY OF WASHINGTON

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A LIST OF THE MAMMALS, REPTILES AND BATRACH-  
IANS OF MONROE COUNTY, INDIANA.

BY W. L. McATEE.

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Monroe County is in the south central part of Indiana. It lies at about the northern end of what may be termed the characteristic cave region of the state. The caves, with their accompanying sinkholes, abundant springs and sparkling brooks, are the most prominent features of its surface. The range of elevation is about 250 feet and Bloomington, the county seat, which is neither the highest nor the lowest point, is 745 feet above sea level. Limestones of subcarboniferous age are the dominant outcropping formations, and it is in them that the caves occur.

The presence of numerous sinkholes, caverns and cave streams modifies the fauna considerably. This influence is most conspicuous, it is true, in the lower groups, such as insects and crustaceans, many of which are permanent residents in the caves, but batrachians and mammals, among the higher forms, also make considerable use of these subterranean dwellings. At least one salamander (*Spelerpes maculicaudus*) habitually breeds in caves, while several others often occur about the mouths. Among mammals, bats are noted frequenters of caves, where they are found the year round, sometimes in great numbers. Deer mice have appropriated caverns for habitations, and foxes have dens in them. Coons, minks and weasels visit them frequently in search of food, and their tracks are abundant in almost every cave. In former times black bears resorted to them, leaving traces of occupancy which are visible to-day.

The principal caves in Monroe County are Saltpetre, six miles southwest of Bloomington; Eller's, five miles southwest; Truitt's, four and three-fourths miles west northwest; and

Mayfield's, four miles northwest. Considerable collecting has been done at these caves. Other favorite localities for collecting are the vicinity of Stony Spring, the Cascades and Griffy Creek, each about one and a half miles in west, north, and north-easterly directions, respectively, from Bloomington and the University of Indiana ; and Salamander Pond, three miles east. The above places will be mentioned frequently in the succeeding pages.

The writer's own observations were made in spare time during four years spent at the University, which was, however, principally devoted to the study of birds. Collecting in the groups now treated was unfortunately confined to a single year, but records from the catalogues of the University Museum and from the available literature have been combined with personal observations in making the list.

I am indebted to the writings of Professor W. S. Blatchley, Doctor O. P. Hay, Mr. A. W. Butler and Doctor B. W. Evermann, and to the last named gentleman as well as to Messrs. A. M. Banta, W. L. Hahn and J. D. Haseman for suggestions and notes. Mr. E. A. Preble kindly criticised the manuscript and Mr. W. H. Osgood corrected the nomenclature of the mammalia and reviewed the specimens of small rodents and the bats.

The occurrence in Monroe County of all species, except a few quoted on authority of the above mentioned writers, and one observed but not collected by myself, is authenticated by specimens in the University museum. The exceptions are starred.

## MAMMALS.

The ungulates and most of the larger carnivora have vanished from our fauna, leaving behind them scarcely a trace even in tradition. The remaining animals are subject to the continual proximity of man, and only those beneath his notice are abundant.

### 1. *Didelphis virginiana* Kerr.

#### OPOSSUM.

Fairly common. A female with four young, each about six inches long, was taken May 25, 1892, and on June 1, of the same year, three young, each four inches long, together with their mother, were obtained. At present the 'possum is frequently taken but on account of its savory qualities few ever reach museums.

Specimens from Bloomington.

2. **Sciurus carolinensis leucotis** (Gapper).

NORTHEASTERN GRAY SQUIRREL.

Not so common as the next but not rare. It has been observed foraging about garbage barrels on the edge of town. The gray squirrel is most frequently found in mixed woods, particularly along streams, a sycamore being a favorite abode. Judging from caged specimens of this species, the black form is not rare.

Bloomington.

3. **Sciurus ludovicianus** Custis.

FOX SQUIRREL.

Very common. Unlike the gray squirrel, which is usually found in mixed woods, the fox squirrel is most common in more uniform growths, such as beech, in higher situations. In some places a veritable feud seems to exist between these and the red-headed woodpeckers. The latter have often been observed compelling their larger antagonists to seek safety in flight.

Bloomington.

4. **Sciurus striatus lysteri** (Richardson).

NORTHEASTERN CHIPMUNK.

Abundant. An inhabitant of roadsides and fields as well as woods. Indigenous on the University campus where it feeds in autumn upon beechnuts and berries of the Virginia creeper (*Parthenocissus quinquefolia*). Specimens are at hand from the Cascades and elsewhere, and it has been observed some distance within the mouth of Mayfield's Cave by Mr. A. M. Banta.

5. **Marmota monax** Linn.

WOODCHUCK.

Common. A railroad embankment is a favorite location for their burrows but they also take advantage of the sinkholes so abundant in the limestone of the region. They appear to wander to some extent in late May and early June, and I have found them dead in highways and stock enclosures at this season. In the present year, I have made an observation in another locality (Washington, D. C.) that shows the woodchuck to be somewhat nocturnal at times, one being seen running about at some distance from the burrow and even feeding after nine P. M. (May 19, 1906). Also, Dr. A. K. Fisher and the writer observed one voluntarily swim the Potomac at a point where it is more than a hundred yards wide (July 22, 1906).

Bloomington.

6. **Sciuropterus volans** Linn.

SOUTHERN FLYING SQUIRREL.

Common. Indigenous on the University campus and established in a barn-loft and some tree boxes in town.

Bloomington.

7. **Mus musculus** Linn.

HOUSE MOUSE.

Abundant near and in the dwellings of man, and also thoroughly established in many orchards and fields. From one nest in a field thirteen house mice were taken in the month of October. They were practically hairless when captured and their eyes were not yet open, but they were raised by feeding them milk with a pipette. They became perfectly tame and fearless and this hastened the end of all, as they persisted in leaving the cage and getting under someone's feet or a door. One killed on February 18, following, was apparently sexually mature.

An adult taken April 8, 1903, had a well marked gray spot on the forehead.

8. **Mus norvegicus** Erxleben.

HOUSE RAT.

Abundant.

9. **Peromyscus leucopus** (Rafinesque).

DEER MOUSE.

Abundant. Commonly their homes are in the rock slides or under logs and isolated stones and every wooded ravine is alive with them. They also live along fence rows and even in the open meadows and fields, but are rarer here than in the woods. Many of them occur in the caves, even at a considerable distance from the mouth.

These cave dwellers usually have a somewhat different appearance from their above-ground brethren, being more pop-eyed and having apparently larger ears and longer whiskers. This may be due to all mice in caves partaking of these particular variations, while in terrestrial specimens, some show them and others do not, the effect thus being lost. Certainly I have measured surface deer mice that had vibrissae and ears of equal or even greater length than specimens from caves.

As deer mice are often said to be strictly nocturnal, some observations tending to show that this conclusion is not strictly true may be of interest. They are at least occasionally seen abroad by day. One afternoon in October, I surprised one near a spring at some distance from its burrow, which it hurriedly sought. I have also seen them running about barnyards near woods in the early morning, and once found one feeding on a hillside at high noon. Near Washington, D. C., I have several times seen them scamper from one burrow to another in the day time, and Dr. A. K. Fisher as well as the writer, has surprised them rummaging about shelves of a cabin by day. In captivity at all events, they do not cease activity on account of daylight.

It has been said that this species is not at all carnivorous, but there is some evidence to the contrary. Many specimens are gnawed in the traps and this is probably not all due to *Blarina*, and certainly is not in the caves where the shrew has not been taken. Furthermore, suet makes an excellent bait, and I have fed caged deer mice with raw meat. Two, con-

fined in a cage with a screech owl, ate a considerable portion of the bird in one night. (See Proc. Ind. Ac. Sci. 1904, p. 84).

Taken at Cascades, Cedar Grove ( $\frac{1}{2}$  mile east of Stony Spring), and Mayfield's Cave. The following notes on breeding habits are perhaps worthy of note. Dates of specimens taken and description of the embryos they contained: March 27, 1903, five embryos,  $\frac{3}{4}$  inch long; March 28, 1903, four embryos,  $\frac{1}{4}$  inch long; March 29, 1903, four embryos, very small. A brood of five young, four females and one male, were taken from an exposed nest in an orchard, April 7, 1903. They measured from 85 mm. to 87 mm. in length, the tail from 35 mm. to 35.5 mm., and the hind foot from 15 mm. to 15.5 mm. At this stage, the eyes are not open and the ears are rather small and laid back in the fur. The prominence of the head and feet is great, the skull is soft, and the tail translucent. The color is slaty, sprinkled with gray and yellowish above, sides of head light ochraceous, nose darker. The under parts and legs and feet, except a narrow strip on the outside of the legs, are abruptly white. Tail, bi-color.

10. **Peromyscus michiganensis** (Aud. and Bach.).

Common. This is the white-footed mouse of the fields, *P. leucopus*, the one of the woods. Their ranges overlap to some extent, but in general, a change from the vicinity of forests to open fields means the vanishing of *leucopus* and the appearance of *michiganensis*. I have collected but one of the present species in a wood. It was with another, presumably of the same kind, curled up in a snug little nest under a log. They were found in the month of December while snow was upon the ground. When their home was destroyed they ran over the snow in a dazed way and one was caught in the hands.

Several of this species were taken about the old ruins of a barn in a dry pasture. Dunn's meadow, Bloomington, also  $1\frac{1}{2}$  miles northwest.

I do not recall having seen this species recorded from Indiana. My identification has been verified by W. H. Osgood.

11. **Fiber zibethicus** (Linn.).

MUSKRAT.

Very common. Still occurs along the Jordan River in the town and in the University campus. In fall, many are found dead along the roads where they have been killed by hoof or wheel. In December, 1903, two were taken in a single week from a cellar which they entered through a tile drain. There is also a migratory or running season in late May and early June.

Bloomington.

12. **Microtus pennsylvanicus** (Ord.).

MEADOW MOUSE.

Common.

Bloomington.



13. **Microtus austerus** (Le Conte).

PRAIRIE MEADOW MOUSE.

Probably common. Taken in the same places with *Peromyscus michiganensis*.

Bloomington. Identified by W. H. Osgood.

14. **Lepus floridanus transitionalis** (Bangs).

NORTHEASTERN COTTONTAIL.

Abundant. Half-grown young taken April 12, 1903. A rabbit from Monroe County, examined by Dr. C. Hart Merriam, was pronounced not quite typical *transitionalis*, but nearer that form than to *meurnsi*.

\***Canis nubilus** Say.

WOLF.

While it is doubtful whether a single wolf still lingers in even the wildest part of Monroe County, a female and litter of young were taken in Brown, the adjoining eastern county, in 1902.

15. **Vulpes fulvus** (Desmarest).

RED FOX.

Not rare. Professor W. S. Blatchley noted the dens of foxes in Salt-petre Cave, and traces of these animals are not hard to find in many parts of the county.

Bloomington.

16. **Lutreola vison** (Schreber).

MINK.

Rather rare. Most often taken in winter. Traces of them have been observed by W. S. Blatchley in Strong's Cave, and by A. M. Banta in Mayfield's.

Bloomington.

17. **Putorius noveboracensis** Emmons.

WEASEL.

Rare.

Bloomington.

18. **Mephitis mephitis** Schreber.

SKUNK.

Common. Lives in sinkholes and other cavities in the rocks and in burrows of its own making. Dr. B. W. Evermann says that it has the habit of visiting smoke houses. Four young, each eight inches long, were taken June 14, 1892.

Bloomington.

19. **Procyon lotor** (Linn.).

RACCOON.

Common. Every one of the numerous caves in this region has at least one 'coon living in it and evidences of these animals are plentiful along every stream. Mayfield's, Strong's and Truitt's caves are favorite haunts.

Bloomington.

\***Ursus americanus** Pallas.

BLACK BEAR.

Extirpated. Wallows and claw marks are still to be seen in Mayfield's, Saltpetre and Eller's Caves. I quote from Professor Blatchley concerning these traces in the latter cave: "We climbed to the entrance of the upper floor, and, passing a short distance within it, found two passages diverging. One to the left, but forty feet in length, ends blindly against a bank of hard clay. Here had been, in days of yore, a bear-wallow, and the marks of bruin's claws were numerous and plainly visible in the clayey walls. The right hand passage proved a long and tortuous one, and had a number of short branches leading from it, one of which showed plainly the evidence of former inhabitancy by bears."\*

In the State Geological Report for 1896, the same author presents a letter from Mr. R. M. Hazelett which contains a vivid account of the killing of two bears in a cave about five miles southwest of Bloomington, some time between 1818 and 1824. This is the latest record we have.

20. **Scalopus aquaticus machrinus** (Rafinesque).

MOLE.

Abundant. Some specimens taken are of much larger size than is indicated by the dimensions usually given for the species. Four measuring 170 mm. or more in length were taken in the spring of 1903 (170, 172, 183, and 190 mm. respectively). Young three-quarters grown (156 mm.) were taken May 2, 1903.

Bloomington.

21. **Blarina brevicauda** (Say).

LARGE BLARINA.

Abundant. Found in the same places as deer mice. Not many occur in damp spots. They often eat the deer mice caught in traps and have no scruples against devouring one of their own kind under the same conditions. In confinement they are very voracious. A female which was taken June 15, 1903, with her four young from a nest in a field, ate blue-bottle flies as fast as they could be given to her. On the morning after she was found dead. Many of this species forage in the evenings under the street are lamps.

Bloomington.

22. **Blarina parva** (Say).

SMALL BLARINA.

Rather rare. Occurs in fields with *Microtus* and *Peromyscus michiganensis*. One was taken under electric light June 2, 1903, and subsequently others were seen at the same place.

Bloomington.

\***Corynorhinus macrotis** (Le Conte).

BIG-EARED BAT.

Previously captured in Indiana, five miles southwest of Greencastle in Putnam, the next county north of Monroe, in December, 1894. Two speci-

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\*Gleanings from Nature. Indianapolis, 1899. p. 114.

mens were seen in a cave.\* A new capture is worthy of record. On November 8, 1902, Mr. A. M. Banta took a fine specimen of this bat in the Twin Caves, four miles east of Mitchell, Lawrence County (the adjoining county south). These localities are farther north than this bat had been previously recorded east of the Mississippi.

### 23. *Lasiurus borealis* (Müller).

RED BAT.

Rather rare. One was taken from a cedar bush April 12, 1903. It was exposed to rain and with the dark streaks and spots made in its russet fur by the drops, its resemblance to a withered leaf caught in the twigs was nearly perfect. Two other specimens were collected.

Stony Spring; Bloomington.

### *Lasiurus cinereus* (Beauvois).

HOARY BAT.

Mr. A. M. Banta contributes the following note on this species: "July 12, 1905. Bloomington, Indiana. During the afternoon a robin chased a specimen of this species out of a tree (?) and after flying some distance, it tumbled down in the driveway. It proved to be a female with two young hanging on. Each young weighed certainly one-third to one-half as much as the old one. In museum of Indiana University." These specimens which were mislaid for a time have recently been recovered, and Mr. W. L. Hahn, formerly of the Division of Mammals, U. S. National Museum, has examined them and confirms the identification.

### \**Myotis subulatus* (Say).

SAY'S BAT.

This species which has been satisfactorily identified from Brookville and Wheatland, Indiana, has been stated to be the most common bat, by almost all writers on the fauna of the southern part of the State. The result of investigations in Monroe County shakes our faith in this conclusion.

Of four specimens in the University museum which were labeled *subulatus*, two proved to be *M. lucifugus* and two *Pipistrellus subflavus*, which indicates how easily these forms are confused by students remote from good reference collections. Furthermore, not a single bat of this species was collected, though a great number of bats were secured during numerous visits to the caves of the region.

While this negative evidence is not of great value, it is sufficient to cause doubt that *subulatus* is really the most abundant species in southern Indiana. In this connection it is worthy of note that when Mr. Gerrit S. Miller, Jr., revised the Vespertilionidae (N. A. Fauna, 13, 1897), only fifty-three specimens of this form were assembled, while *Myotis lucifugus* and *Pipistrellus subflavus*, the other little brown bats of this area, were represented by 562 and 213 examples respectively.

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\*A. W. Butler, Proc. Ind. Ac. Sci. 1894, p. 86.



24. **Myotis lucifugus** (Le Conte).

LITTLE BROWN BAT.

This bat, which has been considered abundant is represented by only three specimens, so that its true status is in doubt. W. L. Hahn reports it to be the most common species in Lawrence County, although he agrees with the writer that *Pipistrellus subflavus* occupies that position in Monroe County.

Truitt's Cave, April 12, 1903. Mayfield's Cave, March 27, 1903.

25. **Pipistrellus subflavus** (F. Cuvier).

GEORGIAN BAT.

The material now at hand indicates this species to be the abundant bat of the region. The following specimens are before me: from Mayfield's Cave, three, March 13, 1903; two, March 27, 1903; four, September 30, 1903, and three, October 3, 1903. From Truitt's Cave, one, April 12, 1903, four undated skins.

Since the Georgian bat has been captured so often in caves, it is probable that the statements made concerning the frequency of bats in these places apply in the main to it. Bats are sometimes found in great masses in the caves in winter but occur there in some numbers at all times of the year. Certain parts of the caves must have been used for long periods to account for the large quantities of bat guano found in some of them, notably Coon's and Eller's, as described by Professor Blatchley.

26. **Vespertilio fuscus** (Beauvois).

BROWN BAT.

Not rare. Has been seen in Mayfield's Cave from December until March. Bloomington, October, 1902.

Following is a list of mammals which have not yet been collected, but whose occurrence in Monroe County is probable: Cooper's Lemming Mouse (*Synaptomys cooperi*) which has been taken in Brown County, Jumping Mouse (*Zapus hudsonius*), Gray Fox (*Urocyon cinereoargenteus*), Northern Masked Shrew (*Sorex personatus*) and Silvery Bat (*Lasionycteris noctivagans*).

## REPTILES.

The nomenclature of this part of the list is that of Dr. E. D. Cope's report on "The Crocodilians, Lizards and Snakes of North America" (Ann. Rep. Smiths. Inst. (1898) 1900) for the snakes and lizards, and that of Dr. O. P. Hay's "Batrachians and Reptiles of Indiana" (17th Ann. Rep. Dept. Geol. (1891) 1892) for the turtles.

1. **Carphophiops amoenus** (Say).

GROUND SNAKE.

One specimen of the form *helenae*.

2. **Zamenis constrictor** (Linn.).

BLACK SNAKE.

Very common. Vicious, not taming readily in confinement.

10 *McAtee—Mammals, Reptiles and Batrachians of Indiana.*

3. ***Diadophis punctatus*** (Linn.).

RING-NECKED SNAKE.

Fairly common.

4. ***Cyclophis aëstivus*** (Linn.).

ROUGH GREEN-SNAKE.

Not an uncommon species; several are seen each year.

5. ***Storeria dekayi*** (Holb.).

Not rare.

6. ***Coluber obsoletus*** (Say).

PILOT SNAKE.

Very common. A great climber; of gentle disposition in confinement.

7. **\**Natrix kirtlandi*** (Kenn.).

One record by Dr. David Starr Jordan.

8. ***Natrix fasciata sipedon*** (Linn.).

WATER-SNAKE.

Common.

9. ***Heterodon platyrhinus*** Latr.

HOG-NOSED SNAKE.

The most abundant species. Remarkable for the paroxysms it undergoes when frightened. There is apparently a regular course which must be gone through with when once begun. Usually the head and neck flatten, the body swells and the hissings commence. This part of the series only is often given and seems to be an intimidatory movement. If this does not produce the desired effect, the violent contortions begin immediately. During these the remains of the last meal, if still available for the purpose, are ejected. The writhing continues for a short time and diminishes in intensity until the snake lies perfectly still on its back. I have never observed one of these spasms that reached the contortion stage that was not carried through to the end. They remain in the death feigning posture from a few seconds to many minutes, and the instinct to simulate death is so strongly developed that if the "dead" snake be turned over to the normal position, it is not content to remain inert but at once flops back to what it evidently considers the "deadest" attitude at its command. My experience has been that the young (of the year) come out of this state very quickly, but I have observed an adult when undisturbed to remain in it not less than ten minutes, and Professor W. S. Blatchley found that with a little attention at intervals to remind them of his presence, they would "play possum" for an hour at a time.

10. ***Osceola doliata triangula*** (Boie).

MILK SNAKE.

Very common. One was found with the tail of a ring-necked snake (*Diadophis punctatus*) protruding from its mouth. It was compelled to disgorge, when its victim was found to be nearly as long as itself. With a little persuasion and assistance it was induced to repeat its feat of deglutition, and was killed. The specimens are now preserved in the University collection as nearly as possible in the position in which they were originally found.

11. **Eutaenia sirtalis** (Linn.).

GARTER SNAKE.

Abundant.

12. **Ancistrodon contortrix** (Linn.).

COPPERHEAD.

Rare.

13. **\*Crotalus horridus** Linn.

BANDED RATTLESNAKE.

Recorded as taken recently in Monroe County by Dr. O. P. Hay in 1892. Professor Blatchley wrote in 1899: "At present it is known to occur only in the broken, wooded portions of such counties as Brown, Monroe, and Greene, where there are many ledges of stone, on which in summer, it can bask for hours in the sunlight, and in whose crevices it can find in winter a suitable abiding place."\* Probably very rare.

14. **Sceloporus undulatus** Latr.

RAIL-FENCE LIZARD.

Common, and popularly named as here noted from an ordinary habit. Sluggish and easily captured when found in the morning or evening, but very active during the middle of the day. On May 18, 1903, a female captured in Brown County laid more than a dozen rather large eggs.

15. **Cnemidophorus sexlineatus** (Linn.).

SIX-LINED LIZARD.

There is one specimen in the museum from this locality; A. W. Butler reports another, and I have one which was captured in 1901.

16. **Eumeces quinquelineatus** (Linn.).

BLUE-TAILED SKINK.

Common. Occurs in about the same places as *Sceloporus*. On a cool April morning two lizards of this species were found in a pile of boards, which was also inhabited by mice. They were very inactive and easily picked up. In a warm room they quickly recovered their activity and were not slow to nip the fingers of anyone putting a hand into their cage. They readily ate flies and bits of meat.

17. **Trionyx spiniferus** LeS.

SPINY SOFT-SHELL TURTLE.

Occasionally taken in the larger creeks.

18. **Chelydra serpentina** (Linn.).

SNAPPING TURTLE.

Fairly common.

19. **Aromochelys odorata** (Bosc).

MUSK TURTLE.

One taken October 6, 1899, from debris in the cellar of an old school house where according to the label it is supposed to have been buried ten years.

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\*Gleanings from Nature, 1899, p. 46.

12 *McAtee—Mammals, Reptiles and Batrachians of Indiana.*

20. ***Chrysemys marginata*** Agassiz.  
WESTERN PAINTED TORTOISE.

The common turtle of the larger creeks.

21. \* ***Malaclemys pseudo-geographica*** (Le S.).  
LE SEUR'S MAP TORTOISE.

Recorded by C. H. Bollman.

22. ***Malaclemys geographica*** (Le S.).  
MAP TORTOISE.

A few records.

23. ***Cistuda carolina*** (Linn.).  
BOX TORTOISE.

Abundant. Some box tortoises kept in the laboratory were confined in a tank where they could remain either in or out of the water. They spent quite as much time floating about in the water as they did resting in the dryer parts of the enclosure. They paired here and in the fall laid a number of eggs, some of them in water.

I have frequently found them feeding on mushrooms and have known them to eat potatoes and apples in captivity.

There is much to be learned concerning the reptile fauna of the county. This is especially true with respect to the turtles. In this group the following forms in addition to those listed, probably occur here: *Trionyx muticus* Le S., Spineless Soft-shelled-Turtle; *Kinosternon pennsylvanicum* (Gmelin), Eastern Mud Turtle; *Chrysemys hieroglyphica* (Holb.); *Chrysemys troosti* (Holb.); and *Chrysemys elegans* (Weid).

Among snakes, *Virginia elegans* Kenn.; *Liopeltis vernalis* (De Kay); *Eutaenia saurita* (Linn.) and *Sistrurus catenatus* (Raf.), which have been taken in Brown, the adjoining eastern county, and *Coluber guttatus* Linn. which has been collected in Putnam County (next north) may be expected here. *Natrix leberis* (Linn.), *Natrix fasciata* (Linn.) and *Natrix rhombifera* (Hall.), are species of general range in the State which also may be found.

One lizard, the glass-snake, *Ophisaurus ventralis* (Linn.) in addition to the species included in this list, has been taken both north and south of here in the State, and is no doubt a member of our fauna.

BATRACHIANS.

Monroe County has a rich batrachian fauna. The genus *Ambystoma* is especially well represented, all of the species\*

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\* Excepting the unique *A. copeianum* Hay.

found within the boundaries of the State being known to breed here. In the numerous caves and cave streams the members of the genus *Spelerpes* are abundant, and the other *Plethodontidae* find suitable homes among the rocky hills and valleys. The most noted locality for batrachians is Salamander Pond, a pool about fifty feet in diameter on the summit of a rather high divide less than three miles from the University. In this pond *Ambystoma microstomum*, *jeffersonianum*, *tigrinum*, *punctatum*, and *opacum*, *Diemyctylus viridescens* and several species of toads and frogs breed.

1. **\*Necturus maculatus** Raf.

WATER-DOG.

Occasionally seen in the larger creeks.

2. **Ambystoma microstomum** (Cope).

SMALL-MOUTHED SALAMANDER.

This species has been taken a few times about the mouth of Mayfield's Cave and at Salamander Pond.

3. **Ambystoma jeffersonianum** (Green).

JEFFERSON'S SALAMANDER.

A very abundant species. More than one hundred and fifty have been taken at one haul of a net in Salamander Pond. They appear in the pond in January. Eggs have been taken as early as the sixteenth of that month and they are abundant as soon as the ice leaves. The young have been observed transforming in the latter part of July.

4. **Ambystoma tigrinum** (Green).

TIGER SALAMANDER.

Rather rare. A few have been taken from under logs in winter and a very few have been observed at Salamander Pond during the breeding season.

5. **Ambystoma punctatum** (Linn.).

SPOTTED SALAMANDER.

Moderately common. Breeds in several small ponds near Bloomington, including Salamander Pond, and may be found immediately after spawning, under logs and stones in the woods and fields.

6. **Ambystoma opacum** (Gravenhorst).

MARBLED SALAMANDER.

Common. In September and October, this species, with eggs, occurs in Salamander Pond. The nests are cavities in the ground, near the surface, under chunks of wood or the dried crust of algae and other plants. They contain from fifty to more than one hundred and fifty eggs. The larvae may reach a length of an inch while in the egg, but they must have water



to live in while completing their development. Under favorable conditions, they transform in February and March, when they adopt the same mode of life as the adults, occurring most commonly under logs along creeks.

#### 7. *Plethodon cinereus* (Green).

ASHY SALAMANDER.

Abundant. The so-called varieties, *P. c. cinereus*, *P. c. erythronotus* and *P. c. dorsalis*, are all found in this region. The first two occur most frequently, being very common; the last is rare. The form *erythronotus* is generally found under rocks and logs, in comparatively dry situations, along the sides of hills, particularly those with southern exposures. The other varieties, however, are most often found near water, at least, at the foot of the hill slopes. The form *cinereus* has often been taken from under stones on the edge of a creek, and two *cinereus* and one *dorsalis* were secured in Mayfield's Cave.

The above facts indicate that these forms have only partially separated habitats, which would favor the idea that they must be considered merely varieties. Often however, two or more of them are found under the same log, whence it is evident there are no important barriers to their mingling. But, since they associate and since they have been shown to breed true, "adult red-backed specimens watching eggs with red-backed embryos, and brown-backed in charge of brown-backed embryos," according to Cope, what good reason is there against designating them full species?

#### 8. *Plethodon glutinosus* (Green).

SLIMY SALAMANDER.

Rather common under logs and stones in damp situations. One was taken in Mayfield's Cave.

#### 9. *Spelerpes longicaudus* (Green).

LONG-TAILED TRITON.

Rather rare. Has been taken in the woods east of Salamander Pond in October (C. H. Kennedy) and larvae were found at the mouth of a cave (Stony Spring) in May. (James Simonton).

#### 10. *Spelerpes maculicaudus* (Cope).

CAVE SALAMANDER.

Abundant. This pretty species occurs in all caves and cave streams and has been collected at Mayfield's and Truitt's caves, Stony and Leonard's springs, and in Griffy Creek. However, Professor Blatchley found two specimens beneath logs a mile or more from any known cave, and half that distance from streams or springs. I have taken it from under boards and stumps also, and it is seen in cellars, greenhouses and other moist places.

The breeding season is evidently in winter, but larvae are present the year round as the new brood is hatched before the old has transformed. From twelve to fifteen months appears to be the usual period required to complete the development.

11. **Spelerpes bislineatus** (Green).

TWO-LINED TRITON.

Common. One finds this salamander most often along streams, particularly cave outlets. In November they come out of the water and pass the winter under stones and logs near the stream. I once found one under such conditions, with the head cleanly severed from the body, but lying in its natural position not far removed. So far the agent of this skillful decapitation has remained unknown.

Stony Spring, Griffy Creek, Cascades.

12. **\*Desmognathus fusca** (Raf.).

BROWN TRITON.

Reported years ago by C. H. Bollman, but not found recently.

13. **Diemyctylus viridescens** Rafinesque.

NEWT.

Abundant. Breeds in all small ponds of the vicinity. The *miniatus* stage has not been noted.

14. **Bufo lentiginosus** Shaw.

TOAD.

Abundant, the variety *americanus* being predominant.

15. **Acris gryllus** (Le Conte).

CRICKET FROG.

Abundant, both varieties, *gryllus* and *crepitans*, occurring here.

16. **Hyla versicolor** Le Conte.

CHAMELEON TREE-FROG.

Abundant.

17. **Hyla pickeringii** (Storer).

PICKERING'S TREE-FROG.

Probably common, few however, being captured.

18. **Rana pipiens** Gmel.

LEOPARD FROG.

Abundant. *Rana p. pipiens* is the common form, but both *sphenocephala* and *brachycephala* have been taken here.

At Harrodsburg, a specimen was obtained that exhibits a duplication of the forearm and hand of the right side, the supernumerary parts being carried in a loop of skin under the throat. (See Am. Nat. XXXV, 1901, p. 33).

19. **Rana palustris** Le Conte.

SWAMP FROG.

Reported by C. H. Bollman. Specimens in museum.

20. ***Rana clamata*** Daudin.

GREEN FROG.

Common. Sometimes wanders into caves, two specimens being taken in Mayfield's.

21. ***Rana catesbiana*** Shaw.

BULL FROG.

Common in the larger ponds.

22. ***Rana sylvatica*** Le Conte.

WOOD FROG.

Rather rare (C. H. Bollman).

In addition to the above mentioned species, the Mud Eel (*Siren lacertura*), the Hellbender (*Cryptobranchus alleghaniensis*), the Scaled Salamander (*Hemidactylum scutatum*), and the Striped Tree Frog (*Chorophilus nigratus*), will probably be found in Monroe County.